

Appl. No. 09/940,743
Amdt. dated January 19, 2004
Reply to Office Action of October 16, 2003

Amendments to the Claims:

The listing of claims will replace all prior versions, and listings, of claims in this application:

Listing of Claims:

1 **Claim 1** (Currently amended): Electronic parts mounting method, comprising the

2 steps of:

3 moving a suction section, including a plurality of suction nozzles, to a parts

4 supply section in which a plurality of the electronic parts are stored so that they can be sucked at

5 the same time,

6 sucking the electronic parts stored in the parts supply section onto the plurality

7 of suction nozzles at the same time; and

8 mounting the sucked electronic parts on a board,

9 wherein the plurality of suction nozzles are classified into groups according to a

10 shift amount of the plurality suction nozzles in each group, a first group including the first suction

11 nozzles having a shift amount within an allowable range for simultaneous suction, and a second

12 group including the second suction nozzles having a shift amount outside the allowable range for

13 simultaneous suction,

14 and then the electronic parts are sucked at the same time at each group by the first

15 and second groups.

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1 **Claim 2** (Currently amended): The electronic parts mounting method according

2 to claim 1:

3 wherein the shift amount is defined between the electronic parts sucked by the first
4 suction nozzles and the second suction nozzles.

1 **Claim 3** (Currently amended): Electronic parts mounting method, comprising the

2 steps of:

3 moving a suction section, including a plurality of suction nozzles, to a parts
4 supply section in which a plurality of the electronic parts are stored so that they can be sucked at
5 the same time,

6 sucking the electronic parts stored in the parts supply section onto the plurality
7 of suction nozzles at the same time;

8 mounting the sucked electronic parts on a board,

9 wherein the plurality of suction nozzles are classified into groups according to a
10 shift amount of the plurality of suction nozzles in each group, a first group including the first
11 suction nozzles having a shift amount within an allowable range for simultaneous suction, and a
12 second group including the second suction nozzles having a shift amount outside the allowable
13 range for simultaneous suction,

14 and then the electronic parts are sucked at the same time at each group by the first
15 and second groups;

16 wherein the shift amount is defined between the electronic parts sucked by the first
17 suction nozzles and the second suction nozzles; and

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18 calculating a position correction value of each suction section according to the
19 shift amount ~~at each group classified of the first and second groups,~~
20 wherein the electronic parts are sucked at the same time ~~at each group by the first~~
21 and second groups after correcting a position of each suction section by using the position
22 correction value.

1 **Claim 4** (Currently amended): The electronic parts mounting method according
2 to claim 3,

3 wherein the position correction value of the suction section is an average of the
4 maximum and the minimum of the shift amount,

5 wherein the shift amount is defined between the ~~a~~ center of each of the plurality
6 of suction nozzle nozzles and the ~~a~~ center position of a part an electronic part at a parts suction
7 position.

1 **Claim 5** (Currently Amended): Electronic parts mounting method, comprising the
2 steps of:

3 moving a suction section, including a plurality of suction nozzles, to a parts
4 supply section in which a plurality of the electronic parts are stored so that they can be sucked at
5 the same time,

6 sucking the electronic parts stored in the parts supply section onto the plurality
7 of suction nozzles at the same time;

8 mounting the sucked electronic parts on a board,

9 wherein the plurality of suction nozzles are classified into groups according to a
10 shift amount of the plurality of suction nozzles in each group, a first group including the first
11 suction nozzles having a shift amount within an allowable range for simultaneous suction, and a
12 second group including the second suction nozzles having a shift amount outside the allowable
13 range for simultaneous suction,

14 and then the electronic parts are sucked at the same time at each group by the first
15 and second groups;

16 wherein the shift amount is defined between the electronic parts sucked by the first
17 suction nozzles and the second suction nozzles;

18 detecting each position of a plurality the plurality of the suction nozzles; and
19 calculating a shift amount according to the each position detected,
20 wherein the shift amount is defined between a center position of the plurality of
21 suction nozzle nozzles and a center position of the electronic parts at the point where the electronic
22 parts are sucked.

1 Claim 6 (Currently amended): The electronic parts mounting method according
2 to claim 5,

3 wherein the center position of the plurality of suction nozzle nozzles is detected
4 after recognizing a tip face of each of the plurality of suction nozzle nozzles.

1 Claim 7 (Currently amended): The electronic parts mounting method according
2 to claim 6,

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3 wherein the center position of the plurality of suction nozzle nozzles is detected
4 after placing an inspection jig on each of the plurality of suction nozzle nozzles.

1 **Claim 8** (Currently amended): The electronic parts mounting method according
2 to claim 3.

3 wherein the shift amount is between the center of each of the plurality of suction
4 nozzle nozzles and the center of a part an electronic part.

5 the shift amount is found by a parts recognition unit for recognizing the suction
6 state of the electronic part onto the one of the plurality of suction nozzle nozzles, and

7 the first and second groups of the suction nozzles and the position correction value
8 of the suction section at each group are changed according to the shift amount

9 wherein the electronic parts are suck sucked simultaneously at each of the first
10 and second groups.

1 **Claim 9** (Currently Amended): The electronic parts mounting method according
2 to claim 1.

3 wherein the plurality of suction nozzles are classified into one of the first group
4 and the second group in order to suck the parts

wherein, at said each group classified, errors for suction have occurred exceeding a predetermined number of times or the parts suction ratio is less than a predetermined value.

1 **Claim 10** (Currently Amended): The electronic parts mounting method according
2 to claim 1, further comprising:

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3 selecting a mode of allowable range for simultaneous suction from several modes;

4 and

5 setting the selected mode in order to classify the plurality of suction nozzles into
6 several groups according to the modes,

7 wherein the modes are divided into several ranks between a mode for giving high
8 priority to productivity and a mode for giving high priority to parts suction ratio.

1 0 Claim 11 (Currently amended): The electronic parts mounting method according
2 to claim 2,

3 wherein the shift amount between the center of a part an electronic part at a parts
4 suction position and the center of each of the plurality of suction nozzle nozzles,
5 and the shift amount is corrected by changing a feed amount of the electronic parts
6 from the parts supply section.

Claims 12-16 (Canceled)

C1 concluded